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EXAMINER	
NATALINI, JEFF WILLIAM	

ART UNIT	PAPER NUMBER
2858	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/660,330	SUSS ET AL.	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7,10-12 and 14-22 is/are rejected.

7)☒ Claim(s) 8,9 and 13 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/8/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

1. Claims 9, 11, 12, and 13 are objected to because of the following informalities:

- In regard to claims 9, 11, and 13 in the formulas of these claims, Voltage is described as being with a V, for example in claim 13 Vc, then in the formula there appears a Vc and a Uc, all the U's in these formulas appear to correspond to a voltage. Please change all U's to V's and make appropriate corrections in the specification as well to all formulas containing this informality.
- In regard to claim 12, it is unclear whether applicant is referring to the load to be measured or the operating parameters, its seems (by referencing the specifications and understanding of the invention) as though the parameters are determined by the simulation. If this is the case please change the "is" in the last sentence to "are" because that would make it clear the operating parameters are being referred to.

Appropriate correction is required.

Specification

2. See claim objections above about correcting formulas in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 5, 12, 16-17, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sen et al. (6754616).

In regard to claims 1 and 16, Sen et al. discloses method for testing a transformer (abstract) using a test signal (source) having a particular frequency (fig 2 (Vin), it is known that this AC signal would be at a certain frequency even if it was zero (direct current); col 5 line 57-62), the method comprising: measuring (device) a plurality of parameters of the transformer (VSENSE1 and 2 in combination with SPICE; col 3 line 10-48) when the transformer is excited by the test signal (Vin); and deriving a simulation model (abstract first sentence) with an evaluation device (col 3 line 55-57) for the transformer using the plurality of measured parameters (col 3 line 12-13), the simulation model representing operating parameters at a plurality of frequencies other than the particular frequency of the test signal (col 1 line 8-12).

In regard to claim 2, wherein the frequency of the test signal is lower then the nominal frequency of the transformer (col 5 line 60-62; can be performed at DC-zero frequency), and the behavior of the transformer is determined at the nominal frequency in the simulation model (behavior is still accurately determined by accuracy tests as stated in col 5 line 53-62; behavior- col 1 line 8-12).

In regard to claim 3, Sen et al. discloses wherein the test signal is applied to the secondary of the transformer (Vin; primary/secondary difference is just correspondence (number of turns) since it is not specifically disclosed the left side can correspond to the secondary of the transformer), and wherein the parameters of the transformer are measured at the secondary of the transformer (VSENSE1; col 3 line 10-48).

In regard to claim 5, Sen et al. discloses wherein the test signal is used for measuring a plurality of voltage dependent parameters in order to derive the simulation model (fig 2 shows Iin based on Vin; col 3 line 10-48).

In regard to claim 12, Sen et al. discloses wherein the operating parameters of the transformer during operating with a frequency deviating from the frequency of the test signal and an arbitrary load (fig 2 Rin- can be considered a load) on the secondary is determined using the simulation model (abstract).

In regard to claim 17, Sen et al. discloses wherein the measuring and evaluation device are integrated in a control unit in the form of computer (col 7 line 12-13).

In regard to claim 20, Sen et al. discloses wherein the test device has storage mean to store the measured parameters of the transformer, the simulation model of the transformer, and information which describes the behavior of the transformer during operation at the frequency deviating from the frequency of the test signal (col 6 line 65 - col 7 line 4).

Claim Rejections - 35 USC § 103

5. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616).

In regard to claim 4, Sen et al. lacks specifically stating that the test signal is applied to the transformer with a voltage that is lower than the voltage required for measuring the knee point when the transformer is operated at the nominal frequency.

It would have been obvious to one with ordinary skill in the art at the time the invention was made to you engineering intuition and understand that you would have to

use under knee voltage as the test signal so you would not lose the functionality of the transformer, because at over knee voltages the core saturates.

In regard to claim 18, Sen et al. contains the test device contains at least one test signal output connectable to the secondary of the transformer (Vin), and a single test input in the secondary of the transformer (VSENSE1- one input is able to measure in the secondary: current, Rin, and hysteresis loss col 3 line 10-54).
Sen et al. lacks specifically a plurality of test inputs connectable to the secondary of the transformer used to measure the parameters.

MPEP 2144.04 VI B states that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

It would have been obvious to one with ordinary skill in the art at the time the invention was made that Sen et al. could include a plurality of sensors that are able to measure multiple parameters in order to provide backups in case one should fail.
In regard to claim 19, Sen et al. lacks wherein the test device is portable.
MPEP 2144.04 V A In re Lindberg, 194 F.2d 732, 93 USPQ 23 (CCPA) states that claiming a device is portable or movable is not sufficient by itself to patentably distinguish and invention).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Sen et al. to make his device portable in order to easily use one instrument to test transformers in multiple locations.

6. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616) in view of Krebs et al. (6072310).

Sen et al. lacks specifically stating that the test signal is applied to the transformer with a voltage that is lower than the voltage required for measuring the knee point when the transformer is operated at the nominal frequency.

Krebs et al. teaches that the knee point divides the behavior of a transformer in the unsaturated and saturated portions, thus when the transformer is over the knee point voltage it is in saturation (col 4 line 60-66).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Sen et al. use under knee voltage as the test signal so you would not lose the functionality of the transformer as the secondary current collapses (col 4 line 67 - col 5 line 5).

7. Claims 6, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616) in view of Ford (5500598).

Sen et al. lacks wherein the resistance of the secondary winding is one of the parameters, wherein a direct current signal is applied to the secondary of the transformer and wherein the voltage across the secondary and the current flowing through are measured in order to determine the resistance (claim 6); and wherein the test signal applied is a square wave (not a sine wave)-claims 14 and 15.

Ford discloses wherein the resistance of the secondary winding is one of the parameters (col 1 line 11-13), wherein a direct current signal is applied to the secondary of the transformer and wherein the voltage across the secondary and the current flowing

through are measured in order to determine the resistance (col 5 line 41-50); and wherein the test signal applied is a square wave (not a sine wave) (col 7 line 51-56).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Sen et al. to determine the resistance of the secondary winding by applying a DC voltage signal and use the voltage and current across the secondary to measure the resistance as taught by Ford in order to thoroughly test the transformer (col 1 line 10-11) and apply the test signal as a square wave as taught by Ford in order to have low power losses (col 7 line 53-54).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616) in view of Semlyen et al. ("Eddy current add-on for frequency dependent representation of winding losses...", herein to be referred to as Semlyen et al.)

Sen et al. lacks disclosing wherein the method comprises deriving the eddy current resistance by measuring the power absorbed by the secondary of the transformer when a test signal having different frequencies is applied.

Semlyen et al. discloses deriving the eddy current resistance (pg 210 equation 4) by measuring the power absorbed by the secondary winding (both windings are considered equation 3b) with a test signal having different frequencies is applied ('w' in formula (4)).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Sen et al. to incorporate deriving the eddy current resistance by measuring the power absorbed by the secondary winding using different frequencies as

taught by Semlyen et al. in order too represent all frequency dependent losses of the winding (last sentence of the first paragraph (not a whole paragraph) on pg 210).

9. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616) in view of Tellinen ("A Simple Scalar Model for Magnetic Hysteresis", herein to be referred to as Tellinen).

Sen et al. applies a periodic signal to the secondary of the transformer (fig 2 Vin) and measures current and voltage parameters (VSENSE col 3 line 10-49).

Sen et al. lacks deriving from the parameters a voltage and current variation on the inductance of the transformer as a function of eddy current in order to determine a hysteresis curve.

Tellinen discloses measurements taken at 50 Hz (top of pg 2204) and deriving using a plurality of parameters (voltage and current are included in Power as it equals V*I) as a function of eddy current (middle of first column of page 2204 to middle of second column) to determine the hysteresis curve (fig 14).

In regard to claim 11, Sen et al. as modified does not specifically disclose determining the voltage and current of the main inductance of the transformer, but it would be obvious to one skilled in the art to use engineering intuition and understand if you subtract the voltage measured in the secondary from the current multiplied by the resistance you would get the main inductance voltage of the transformer after eddy current losses and similarly for the main current, you would subtract the current in the secondary from the current losses due to eddy current (Vsecondary/Reddy).

10. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al. (6754616) in view of Georges et al. (Publication 2002/0161558).

Sen et al. lacks wherein an the test device has an interface for transmitting information to an external device where the information is the measured parameters of the transformer (claim 21); and the device comprises an interface for receiving external control signals for control of a test sequence to be implemented (claim 22).

Georges et al. discloses wherein an the test device has an interface for transmitting information to an external device where the information is the measured parameters of the transformer (abstract); and the device comprises an interface for receiving external control signals for control of a test sequence to be implemented (para 15).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Sen et al. to incorporate the an interface being able to transmit information to an external device as taught by Georges et al. in order to compare the models outputs with threshold values so alarms or control signals can be generated (para 6) and accept information from the external device also taught by Georges et al. in order to improve the performance of the transformer (para 15).

Allowable Subject Matter

11. Claims 8, 9, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regard to claim 8, measurement at two different frequencies of the power absorbed at the transformer and then using the specific formulas as claimed for P1, P2, (,

and (and combination as claimed are not disclosed in the prior art. Claim 9 would be allowed because it depends from claim 8.

In regard to claim 13, determining a variation of interlinked flux of the transformer with time as a function of frequency, using this to derive the main inductance of the transformer by using the specific formulas supplied and the combination as claimed is not disclosed in the prior art.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gruenert (6396279) teaches a test apparatus that is useful in testing transformers and simulates the transformer within the test device. Degeneff et al. (5781764) teaches a simulation model for a transformer and it is used over a frequency range.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information

about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

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PRIMARY EXAMINER